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3M™ ESD Pro User's Guide

ESD Event Indicator
Model CTM082

3M™ ESD Pro
Model CTM082

EXPLANATION OF SIGNAL WORD CONSEQUENCES	
⚠ **WARNING:**	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury and/or property damage.
⚠ **CAUTION:**	Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury and/or property damage.
NOTICE:	Indicates a potentially hazardous situation, which, if not avoided, may result in property damage.

⚠ **WARNING**

To reduce the risks associated with environmental contamination:

- When working with the automated equipment, always observe safety precautions as recommended by equipment manufacturer and your company's practices

⚠ **CAUTION**

To reduce the risks associated with environmental contamination:

- Dispose of the monitor in accordance with local, state, and federal regulations

NOTICE

To reduce the risks associated with property damage:

- Periodically check that the indicator is functioning properly

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Industry Canada

This Class A digital apparatus complies with Canadian ICES-003.

The 3M™ ESD Pro is easy-to-use hand-held indicator and counter of ESD events that can damage sensitive components and cause tool lockups, erratic behavior and parametric errors.

Event Counter

A four-digit display counts the number of events equal to or exceeding the threshold. To reset the counter, press the actuator of the “Set” side switch inwards. The counter is also reset when the power is turned off.

CDM Mode

In a typical industrial environment there are many sources that produce signals similar to those of ESD events. Such signals may include relays, solenoids, stepper motors and alike. In order to separate charge-device type events from non-related EMI (electromagnetic interference) events, 3M™ ESD Pro employs a patent-pending system that analyzes waveforms of the signals and rejects the ones that are different from a “classic” shape of an ESD event. More specifically, CDM (charged device model) waveform is set as a template.

In order not to miss ESD events, in case of the questional waveform that has a possibility of being a legitimate ESD event, the 3M™ ESD Pro registers the event as an ESD event leaving the user to make a determination.

First, try to use the 3M™ ESD Pro with CDM mode turned off. This allows you to assess the complete environment. If you observe extraneous events, then the turn CDM mode on.

How-To

ESD events are the ultimate indications of whether it is safe to handle sensitive components in your environment. If you observe strong ESD events, it is not advisable to continue work until the situation is corrected. Whether you already have static-dissipative mats, flooring, wrist straps and ionizers is less relevant—it may still be unsafe to handle sensitive components in the environment.

You can use the 3M™ ESD Pro for different applications:

- ESD audit
- ESD diagnostics and troubleshooting
- ESD tool qualification
- EMI diagnostics
- ...and more

The 3M™ ESD Pro detects ESD events by the specific electromagnetic signature these events produce. As such, the performance of the 3M™ ESD Pro must be looked at in view of wave propagation. Just like with a microphone, the farther away from the source of the signal you are, the weaker the signal is. When searching for the sources of ESD events, it is advisable to get as close as is practical considering necessary safety precautions to the suspected sources. In a typical tool, such as an IC handler or a pick-and-place SMT machine, such sources of ESD events may include places of IC pick-up and IC

placement on any conductive or even dissipative surface. When working with the automated equipment, always observe safety precations as recommended by equipment manufacturer and your company's practices.

Operation

When the 3M™ ESD Pro is turned on, it is ready to detect, count and measure ESD events.

Bar Graph Display

The 10-LED bar graph shows the relative strength of an ESD event. If an ESD event does not exceed the set alarm level, LEDs indicating its strength are green. Whenever the strength of an event exceeds the set threshold, LEDs turn red.

Event strength is a factor of many variables:

- the accumulated static voltage
- the capacitance of the charged objects (a larger object holds more charge than a smaller one)
- the physical size of discharging objects
- the environment
- the distance from ESD event occurrence

Therefore, one should exercise good judgement in comparing the strength of ESD events captured under different conditions.

Threshold Adjustment

The 3M™ ESD Pro can detect ESD events in a wide dynamic range. For most applications, only the events that exceed certain strengths are of importance.

Threshold setting in the 3M™ ESD Pro is critical in identifying only ESD events of the strength equal or above the level of importance to you.

Threshold setting is done by a small rotary/push switch on the right side of the 3M™ ESD Pro.

Checking the Current Threshold

Simply push the actuator of the switch inwards. One red LED will show the current ESD event threshold. Any event equal to or exceeding this level will produce a count and a beep, and the LED bar graph will show it in red. An event below this level will still be shown on the bar graph in green, but no count or sound will be produced.

Setting the Threshold

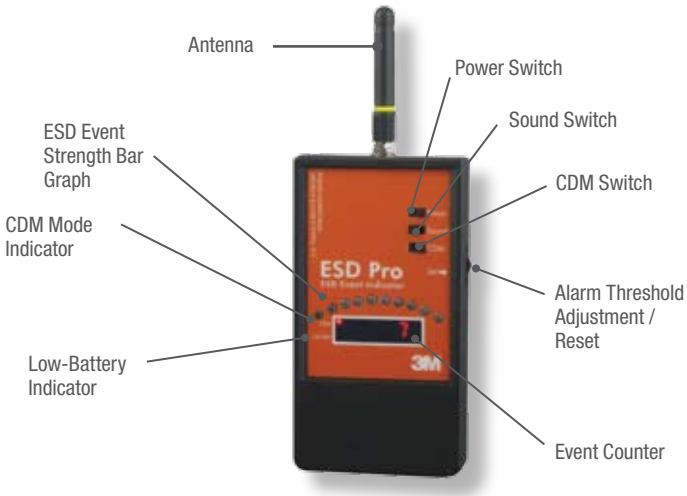
To set a new threshold, do not press the switch. Rather, move its actuator up or down. Once the switch begins to move, one red LED appears on the bar graph display. As the switch moves up and down, this red LED moves accordingly and its position indicates the new theshold level.

Saving the Threshold Level

After the new threshold is set, release the switch actuator and then press it inwards. The new current threshold is now saved. The next time you power up your 3M™ ESD Pro, this level will be automatically set.

Brief Tour of your 3M™ ESD Pro

Please refer to the following pages of this User's Guide for a detailed explanation of each control, indicator and connection.



Controls and Indicators

Power Switch	Turns power on and off
Sound Switch	Turns the sound on and off
CDM	Turns EMI-rejection mode on and off
Alarm Threshold	Adjusts alarm threshold up and down. Displays current alarm threshold. Resets the Event Counter
Event Counter	Counts ESD events above the set threshold
ESD Event	Bar Graph Shows relative ESD event strength
CDM Indicator	Shows that 3M™ ESD Pro is in CDM mode (rejection of EMI Events)
Low Battery	Shows that the battery needs to be replaced

Overview

The 3M™ ESD Pro is a hand-held indicator of ESD events that shows the relative strength of each ESD event and counts the number of ESD events above the set threshold.

ESD events, or electrostatic discharges, can damage sensitive electronic components. The ultimate goal of ESD protection, such as grounding, wrist straps, ionizers, static-dissipative mats and alike is to prevent ESD events, or, at least, decrease their strength and frequency of occurrence. The only way to verify that your ESD protection works is by knowing whether you have ESD events in your environment, how strong they are and how many of them occur. Thus, instruments such as the 3M™ ESD Pro serve as your ultimate measure of effectiveness of your ESD protection.

The 3M™ ESD Pro is capable of rejecting non-ESD related EMI (electromagnetic interference) events. This patent-pending methodology allows assessment of the ESD environment in places where EMI events resulting from stepper motors, solenoids, relays and other similar events abound.

The 3M™ ESD Pro is an indicator, not a metrology instrument. It displays the relative strength of ESD events, not their absolute values. For 3M instruments that provide you with data on absolute values of ESD events, look for 3M™ EM Aware and 3M™ EM Eye on the website listed on the back of this User's Guide, call our customer service or contact your local authorized representative.

General

Power

3M™ ESD Pro uses a 9V alkaline battery. Do not use any other type of battery. If you are not using your 3M™ ESD Pro for an extended period of time, remove the battery from the unit in order to prevent damage caused by battery leakage. Note: Not all batteries labeled similarly have the same performance. Often an off-brand alkaline battery has only 50% to 60% of the capacity of the leading brand-name battery.

Installing the Battery

Slide off the battery door at the back of 3M™ ESD Pro and attach the 9V battery to the battery clips. Observe the polarity of the battery. Re-install the battery door.

Low-Battery Indicator

When battery voltage gets low (less than ~20% capacity remains), the low battery indicator on the display appears. At this point it is a good idea to install a new battery to assure optimal performance.

Turning 3M™ ESD Pro On and Off

Move the actuator of the power slide switch to the right. The ESD event counter should display a number of captured events, usually “0” at this point. The events counter is reset when the power is turned off.

To turn the power off, move the actuator of power slide switch to the left. The 3M™ ESD Pro has no automatic shut-off. Don’t forget to turn it off when not in active use.

Antenna

In order for the 3M™ ESD Pro to detect ESD events, its antenna needs to be properly installed. Screw the antenna using only your fingers—no tools since overtightening the connection may lead to damage to the instrument.

The 3M™ ESD Pro can also work with other types of antennae, including the ones that would allow you to detect ESD events in small spaces and also within a wide temperature range. Please visit our website for available antennae for the 3M™ ESD Pro.

Sound

The ESD Pro can produce audible alarm when an event is deleted. In order to enable this function, move the actuator of sound slide switch to the right.

The Next Step

If you want to further your knowledge of strength of ESD events and have a record of the ESD environment, please consider 3M™ EM Aware ESD Monitors. You can find information at www.3M.com/static.

Customer and Technical Support

For customer and technical support:

within the US Contact:
3M Electronic Solutions Division,
Customer Service Department 866-722-3736
3M Santa Cruz 831-459-7488

For customer service and technical support outside the US contact your local authorized 3M representative—see the distributor section at www.3M.com/static.

3M™ ESD Pro Static Event Detector CTM082

Regulatory Information

China RoHS

Electronic Industry Standard of the People's Republic of China, SJ/T11363-2006, Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products

This symbol, per Marking for the Control of Pollution Caused by Electronic Information Products, SJ/T11364-2006, means that the product or part **does** contain a substance, as detailed in the chart below, in excess of the following maximum concentration values in any homogeneous material: (a) 0.1% (by weight) for lead, mercury, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers; or (b) 0.01% (by weight) for cadmium. Unless otherwise stated by 3M in writing, this information represents 3M's best knowledge and belief based upon information provided by third party suppliers to 3M.

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Name and Content of Hazardous Substances or Elements

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	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 Cr(VI)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电容引脚 (Termination in capacitor)	×	○	○	○	○	○
印刷电路板焊盘/安装孔 (Terminations in PCBs)	×	○	○	○	○	○
0603电阻引脚 (Terminations in resistors 0603)	×	○	○	○	○	○
电感器(Inductor)	×	○	○	○	○	○
扭扣式电源连接器 (Battery snap connector)	×	○	○	○	○	○
装置的焊接部 (Solder in instrument)	×	○	○	○	○	○
IC焊接部 (Solder in IC)	×	○	○	○	○	○
蜂鸣器焊接部 (Solder in buzzer)	×	○	○	○	○	○

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Formerly Credence Technologies
U.S. Patents 6,563,319;6,762,607. Other patents pending.

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